**Name: Date:**

**Task 2 - Theory Assessment**

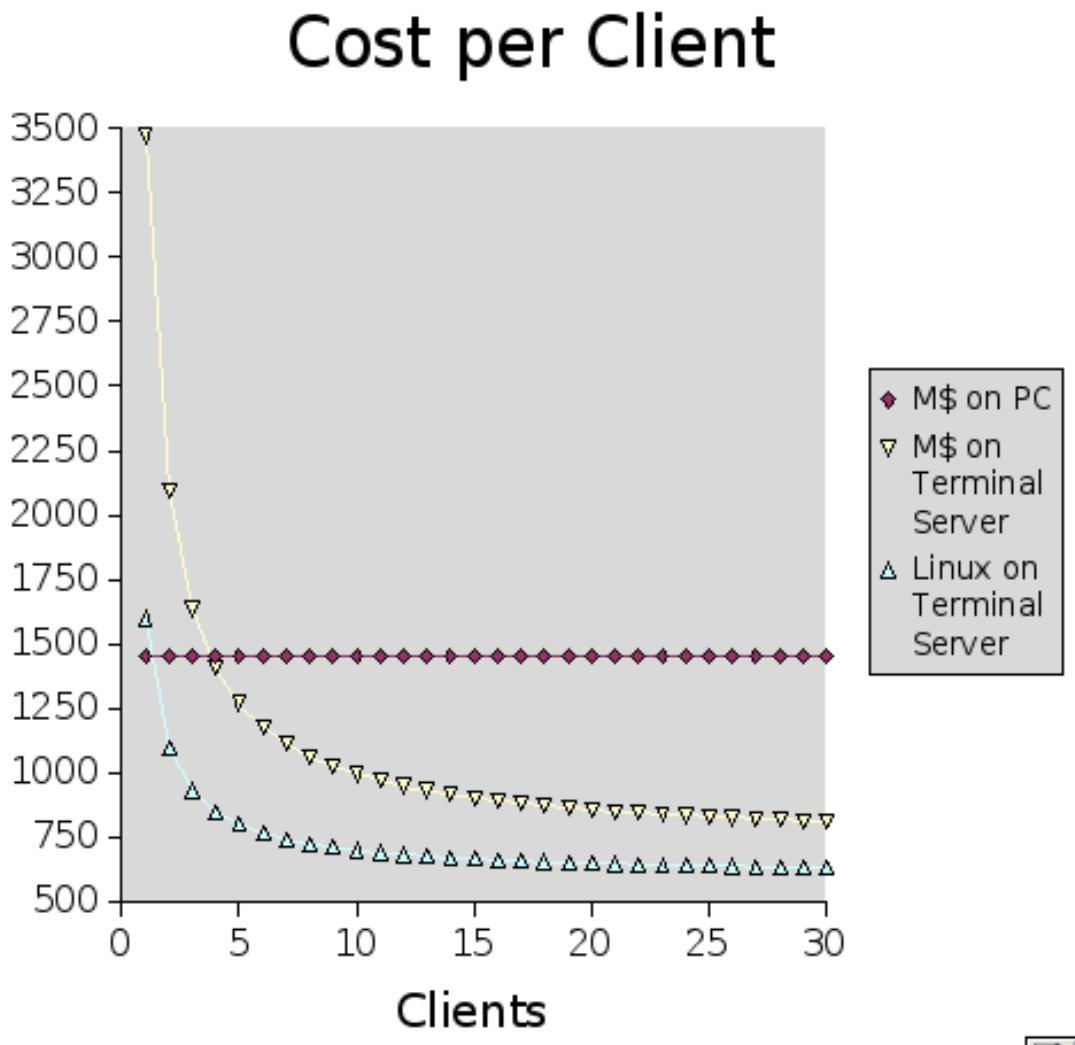
**Research and identify suitable technology solutions applicable to the project**

**Gather power consumption data on ICT equipment required for an energy audit based on an agreed standard**

**Thin Client Networks**

A description...

<http://www.ikon.is/ikon/content/view/114/52/lang,english/>



**Thin Client**

<http://en.wikipedia.org/wiki/Thin_client>

<http://www.lamarheller.com/technology/thinclient/powerstudy.pdf>

<http://net.educause.edu/ir/library/pdf/DEC0005.pdf>

A thin client (sometimes also called a lean or slim client) is a computer or a computer program which depends heavily on some other computer (its server) to fulfill its traditional computational roles. This stands in contrast to the traditional fat client, a computer designed to take on these roles by itself. The exact roles assumed by the server may vary, from providing data persistence (for example, for diskless nodes) to actual information processing on the client's behalf.

Thin clients occur as components of a broader computer infrastructure, where many clients share their computations with the same server. As such, thin client infrastructures can be viewed as the providing of some computing service via several user-interfaces.

Thin-client computing is also a way of easily maintaining computational services at a reduced total cost of ownership.

Name: Date:

**Theory (50Marks)**

Complete the following:

Questions (5 marks each)

1. Give an overview of thin client computing to your client.

ANSWER: Thin-client computing is where we replace desktop hardware with smaller terminals. These terminals connect to either a server with thin client software or the thin clients are setup to allow connection to a virtual computer. These allow power cost reductions and also hardware support reductions. The thin-client solutions do not diminish the ability of your employees to work or minimize their computing activities. Thin-client computing is designed to allow your employee to continue doing everything they do now, but with reduced energy costs and also operating costs.

1. Explain the advantages of a thin client.

ANSWER:

* + 1. reduced power consumptions
    2. simplified support
    3. enhanced security
    4. reduced carbon foot print & Waste foot print
    5. Faster repair and deployment speeds

1. Explain the disadvantages of thin client.

ANSWER:

* + 1. low computing power
    2. restricted to basic operations
    3. unable to upgrade hardware
    4. software restrictions

1. Explain alternative ways to setup thin client networks in GNU/Linux

ANSWER: setting up a thin-client network with linux is quite easy. Linux comes straight out of the box with a thin client option which makes it easy to use. With two or three clicks of the mouse you can have a thin client setup on a device quite easily. The terminal server is also very easy to setup and simple again. The benefits of this software is its easy to install and free. It also come with word processing software built into the software. Another benefit is if you would like to have a windows terminal server you can still use ubuntu thin clients as the software is compatible.

1. Recommend a Linux thin client solution for a small school classroom of 16 seats (clients)

ANSWER: a good cost effective solution for a classroom of 16 seats would be to use a singular Linux Terminal server. Connecting to the server would be 16 Thin clients installed with Linux thin-client technology. They would connect to the server via WIFI through a CISCO wireless hub/switch. The linux software is free so no costs would be required there, for document editing software linux comes with libre office or open office. Both very much compatible with windows applications. By using a wifi method of access this allows the class room to expand or shrink with no need to modify or run lengths of cat 5 cable. As the classroom will be doing basic computing a wired network ( although much more reliable and speedy) would be overkill. The costs to implement and run the required cabling would limit the class room to 16 clients only and no room to expand.

1. Sketch your solution

ANSWER:

1. Detail hardware:

ANSWER:

|  |  |  |
| --- | --- | --- |
| Item | Cost | URL |
| Thin client HP T5565 | $299.00 x 16 = 4784 | http://h71016.www7.hp.com/dstore/MiddleFrame.asp?page=config&ProductLineId=573&FamilyId=3404&BaseId=35027&oi=E9CED&BEID=19701&SBLID= |
| Switch - Linksys Smart Wi-Fi Router EA4500 Dual-Band N900 Router with Gigabit and | $189.99 | http://homestore.cisco.com/en-us/Routers/Linksys-EA4500-Dual-Band-N900-Router-with-Gigabit-USB\_stcVVproductId145330245VVviewprod.htm |
| Server - Dell PowerEdge T110 II compact tower server | $699 | http://www.dell.com/au/business/p/poweredge-t110-2/fs |
| Cables | N/A | N/A |
| Modem | N/A | N/A |
| **TOTAL COST** | $5672.99 | N/A |

1. Detail software:

ANSWER:

|  |  |  |
| --- | --- | --- |
| Item | Cost | URL |
| ubuntu | $0 | http://www.ubuntu.com/ |
| Ubuntu server | $0 | http://www.ubuntu.com/business/server/overview |
| **TOTAL COST** |  |  |

1. What is the expected performance of your solution?

ANSWER:

Client boot time: 2-3 minutes

Office apps installed: Libre Office ( word, powerpoint, excel, etc.)

Operational Issues: Potential netowork drop outs if network is overloaded.

1. Explain the sustainability merits of thin client architectures

ANSWER

Features: Lower power consumption @ 13 watts per device, reduced ongoing costs, simplified support.

Advantages: low power consumption, energy star efficient, easy to support, reduced posibility of students tampering with equipment that could go wrong.

Disadvantages: limited computing power, higher functions unavailable, potential if wireless system is overloaded then dropouts may occur.

**Practicum (50Marks)**

* **Identify power consumption of a thin client system under different operating conditions using the Current Cost EnviR Energy Monitor and appropriate power lead or similar energy meter.**
* **Recommendations on upgrading computer system.**

1. Record power consumption and notes e.g. range, variability, operating conditions:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Condition** | **Web Client** | **Y210** | **Y100** | **Wyse** | **Ferrari Server** | **Black Box Server** |
| **OFF** | 0.27 | 1 | 0.3 | 11 | 3.1 | 19 |
| **Max Boot** | 5.1 | 5 | 3.5 | 12 | 30 | 42 |
| **Idle** | 3.4 | 5 | 3.2 | 11 | 22 | 42 |
| **Word/Excel** | 5.1 | 5 | 3.3 | 12 | 24 | 44 |
| **Browsing** | 4.6 | N/A | N/A | N/A | N/A | N/A |
| **Video** | 6.7 | N/A | N/A | N/A | N/A | N/A |
| **Music** | 5.2 | N/A | N/A | N/A | N/A | N/A |
| **NOTE : Monitor** | 21 |  |  |  |  |  |
| **Note: Switch** | 11 |  |  |  |  |  |

After looking at the above readings it is clear to see that the thin client comes in significantly under powered compared to a server or desktop.

1. Evaluate the extent to which sustainability could be integrated into an upgrade of the computer system.

Total power draw for a 20 seat thin client system:

20 Y100 units use 66 watts of power (20 x 3.3 watts) during a typical word processing training session,

Along with 420 watts for the monitors (20 x 21 watts) that’s a total of

66+420=486 watts of power for the machines factor in 11 watts for a network switch and

24 watts for the server a typical 20 seat thin client would use around **521** watts of power.

Total power draw for a 20 seat PC system:

1 desktop uses 24 watts,

20x24 = 480 watts

1 screen uses 21 watts,

20x21 = 420 watts

1 desktop with 1 monitor uses 45 watts,

20x45 = 900 watts

switch uses 11 watts

1 server uses 24 watts power,

total cumulative power consumption : 935 watts

Advise your recommendations:

It is easy to see why using a thin client based solution is a lot cheaper than using a computer based solution. A thin client solution uses 521 watts of power versus 935 watts of power.

935 – 521 = 414 watts of power saving. You can nearly run two instances of thin clients for the energy cost of 1 x 20 desktop environment. For basic computing a thin client environment would be the perfect recommendation. There is nothing functionally wrong with the thin client environment as opposed to the desktop environment. My recommendation would be to setup and install a thin client environment.